

REMARKS

Prior to examination, Applicants wish to modify the format in which certain claims are presented. The claims presented in this Amendment are those which Applicants wish to have examined in the instant application. No new matter is believed to have been added.

Included herewith is a set of marked-up claims indicating where claims have been amended. Also enclosed is a clean set of presently pending claims, *which is provided merely for the convenience of the examiner and is not intended to be form part of the official record.*

No fee is believed to be necessary for entry of this amendment. Nevertheless, the accompanying transmittal letter gives certain deposit account information and authorization.

Questions and comments regarding this submission and the application in general should be directed to the attention of the undersigned.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1 (amended). A process for forming an extended polyalkylene-grafted interpolymer or gel, comprising:

- a) in a mixer, mixing
 - 1) a polymer comprising mer units derived from maleic anhydride and mer units derived from at least one of
 - (A) a vinyl aromatic monomer, and
 - (B) an R¹(R²)ethylene monomer in which R¹ and R² independently are selected from H and substituted or unsubstituted C₁-C₂₀ alkyl or alkoxy groups, and
 - 2) a maleated polyalkylene,so as to form a blend;
- b) in said mixer, adding to said blend[, adding] a diamine and allowing it to react with the mer units derived from maleic anhydride and with the maleated polyalkylene to form a polyalkylene grafted interpolymer;
- c) allowing the polyalkylene-grafted interpolymer to cool in said mixer and, without removing the interpolymer from the mixer, adding an extender to provide said extended polyalkylene-grafted interpolymer; and
- d) optionally, extruding the extended polyalkylene-grafted interpolymer to form a gel having a tan δ of at least 0.3.

2 (amended). The process of claim 1 wherein step a) includes mixing from about 50 to about 99 weight [%] percent of said polymer and from about 1 to about 50 weight [%] percent of said maleated polyalkylene and wherein step b) includes adding from about 0.1 to about 10 weight [%] percent of said diamine.

4 (twice amended). The process of claim 1 wherein steps b), c) and, optionally a) are carried out sequentially [in a mixer] with no physical manipulation of said polyalkylene grafted interpolymer prior to step c) [and without removing any of the materials from said mixer].

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13 (amended). A single batch process for preparing a polymer composition which includes a polyalkylene-grafted interpolpolymer, said process comprising:

- a) forming a maleimide interpolpolymer in a mixing vessel by reacting an amine with a portion of maleic anhydride-derived mer units of an interpolpolymer comprising maleic anhydride-derived mer units and at least one of
 - 1) vinyl aromatic-derived mer units, and
 - 2) $R^1(R^2)$ ethylene-derived mer units in which R^1 and R^2 independently are H or substituted or unsubstituted C_1 to C_{20} alkyl groups or alkoxyl groups;
- b) adding sufficient maleated polyalkylene such that the mixing vessel contains from about 1 to about 50 weight percent maleated polyalkylene and from about 50 to about 99 weight percent maleimide interpolpolymer;
- c) without removing the product of step b) from the vessel, mixing from about 0.1 to about 10 weight [%] percent of a diamine with the maleimide interpolpolymer and maleated polyalkylene in the mixing vessel to form said polyalkylene-grafted interpolpolymer; and
- d) [optionally,]without removing the product of step c) from the vessel, cooling the polyalkylene-grafted interpolpolymer[in the mixer] to a temperature at which an extender is stable in the polyalkylene-grafted interpolpolymer[.] and adding an extender[to the mixer].

1. A process for forming an extended polyalkylene-grafted interpolymers or gel, comprising:
 - a) in a mixer, mixing
 - 1) a polymer comprising mer units derived from maleic anhydride and mer units derived from at least one of
 - (A) a vinyl aromatic monomer, and
 - (B) an R¹(R²)ethylene monomer in which R¹ and R² independently are selected from H and substituted or unsubstituted C₁-C₂₀ alkyl or alkoxy groups, and
 - 2) a maleated polyalkylene,so as to form a blend;
 - b) in said mixer, adding to said blend a diamine and allowing it to react with the mer units derived from maleic anhydride and with the maleated polyalkylene to form a polyalkylene grafted interpolymers;
 - c) allowing the polyalkylene-grafted interpolymers to cool in said mixer and, without removing the interpolymers from the mixer, adding an extender to provide said extended polyalkylene-grafted interpolymers; and
 - d) optionally, extruding the extended polyalkylene-grafted interpolymers to form a gel having a tan δ of at least 0.3.
2. The process of claim 1 wherein step a) includes mixing from about 50 to about 99 weight percent of said polymer and from about 1 to about 50 weight percent of said maleated polyalkylene and wherein step b) includes adding from about 0.1 to about 10 weight percent of said diamine.
3. The process of claim 1 wherein said polymer comprises from about 0.01 to about 5 weight percent mer units derived from maleic anhydride.
4. The process of claim 1 wherein steps b), c) and, optionally a) are carried out sequentially with no physical manipulation of said polyalkylene grafted interpolymers prior to step c).

5. The process of claim 1 wherein step c) includes mixing about 10 to about 90 weight percent of said polyalkylene-grafted interpolymer with a total amount of about 90 to about 10 weight percent of said extender.

6. The process of claim 1 wherein at least one of the following is true:
said vinyl aromatic monomer is selected from any one or more of styrene, α -methylstyrene, *p*-methylstyrene, 4-phenylstyrene, *m*-methylstyrene, α -methylstyrene, *p*-tert-butylstyrene, and dimethylstyrene; and

R^1 and R^2 independently are selected from methyl, ethyl, propyl, isopropyl, butyl, isobutyl, pentyl, isopentyl, hexyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, octadecyl, nonadecyl, eicosyl, cyclopropyl, 2,2-dimethylcyclopropyl, cyclopentyl, cyclohexyl, methoxymethyl, methoxyethyl, methoxypropyl, methoxybutyl, methoxypentyl, methoxyhexyl, methoxyoctyl, methoxynonyl, ethoxydecyl, ethoxymethyl, ethoxyethyl, ethoxypropyl, ethoxybutyl, ethoxypentyl, ethoxyhexyl, ethoxyheptyl, ethoxyoctyl, ethoxynonyl, ethoxydecyl, propoxymethyl, propoxyethyl, propoxypropyl, propoxybutyl, propoxypentyl, propoxyheptyl, propoxyoctyl, propoxynonyl, propoxydecyl, butoxymethyl, butoxyethyl, butoxypropyl, butoxybutyl, butoxypentyl, butoxyhexyl, butoxyheptyl, butoxyoctyl, butoxynonyl, butoxydecyl, pentyloxymethyl, pentyloxyethyl, pentyloxypropyl, pentyloxybutyl, pentyloxypentyl, pentyloxyhexyl, pentyloxyoctyl, pentyloxynonyl, pentyloxydecyl, hexyloxymethyl, hexyloxyethyl, hexyloxypropyl, hexyloxybutyl, hexyloxy-pentyl, hexyloxyhexyl, hexyloxyheptyl, hexyloxyoctyl, hexyloxynonyl, hexyloxydecyl, heptyloxymethyl, heptyloxyethyl, heptyloxypropyl, heptyloxybutyl, heptyloxypentyl, heptyloxyhexyl, heptyloxyheptyl, heptyloxyoctyl, heptyloxynonyl, heptyloxydecyl, octyloxymethyl, octyloxyethyl, octyloxypropyl, octyloxybutyl, octyloxypentyl, octyloxyhexyl, octyloxyheptyl, octyloxyoctyl, octyloxynonyl, decyloxymethyl, decyloxyethyl, decyloxypropyl, decyloxybutyl, decyloxy-pentyl, decyloxyhexyl, decyloxyheptyl, 1-methylethyl, 1-methylpropyl, 1-methylbutyl, 1-methylpentyl, 1-methylhexyl, 1-methylheptyl, 1-methyloctyl, 1-methylnonyl, 1-methyldecyl, 2-methylpropyl, 2-methylbutyl, 2-methylpentyl, 2-methylhexyl, 2-methylheptyl, 2-methyloctyl, 2,3,3-trimethylbutyl, 3-methylpentyl, 2,3-dimethylpentyl, 2,4-dimethylpentyl, 2,3,3,4-tetramethylpentyl, 3-methylhexyl, and 2,5-dimethylhexyl.

7. The process of claim 1 wherein said maleated polyalkylene includes mer units derived from at least one of ethylene and propylene.

8. The process of claim 1 wherein, prior to step a), an amine is reacted with a portion of the mer units derived from the maleic anhydride to form maleimide mer units, wherein at least one of the following optionally is true of said imidization:

it is carried out immediately preceding step a) with no physical manipulation of the polymer prior to step a), and

it and step a) are carried out in a mixer without removing the imidization product from the mixer.

9. The process of claim 8, wherein said amine comprises from 1 to 50 carbon atoms and is selected from at least one of alkyl amines, alkyl benzyl amines, alkyl phenyl amines, alkoxybenzyl amines, alkyl aminobenzoates, and alkoxy aniline.

10. The process of claim 8, wherein said amine is a primary amine.

11. The process of claim 1 wherein said diamine is selected from aliphatic or cycloaliphatic diamines corresponding to the general formula $R^3(NH_2)_2$ wherein R^3 represents

- 1) a C_2-C_{20} aliphatic hydrocarbon group,
- 2) a C_4-C_{20} cycloaliphatic hydrocarbon group,
- 3) a C_6-C_{20} aromatic hydrocarbon group, or
- 4) a C_4-C_{20} N-heterocyclic ring.

12. The process of claim 11, wherein said diamine is selected from at least one of ethylene diamine; 1,2-propylene diamine; 1,3-propylene diamine; 1,4-diaminobutane; 2,2-dimethyl-1,3-diaminopropane; 1,6-diaminohexane; 2,5-dimethyl-2,5-diaminohexane; 1,6-diamino-2,2,4-trimethyldiaminohexane; 1,8-diaminooctane; 1,10-diaminodecane; 1,11-diaminoundecane; 1,12-diaminododecane; 1-methyl-4-(aminoisopropyl)-cyclohexylamine; 3-aminomethyl-3,5,5-trimethyl-cyclohexylamine; 1,2-bis-(aminomethyl)-cyclobutane; 1,2-diamino-3,6-dimethylbenzene; 1,2-diaminocyclohexane; 1,4-diaminocyclohexane; 1,2-diaminodecalin; 1,4-diaminodecalin; 1,5-diaminodecalin; 1,8-diaminodecalin; 1-methyl-4-aminoisopropyl-cyclohexylamine; 4,4'-diamino-dicyclohexyl; 4,4'-diamino-dicyclohexyl methane; 2,2'-(bis-4-amino-cyclohexyl)-propane; 3,3'-dimethyl-4,4'-diamino-dicyclohexyl methane; 1,2-bis-(4-aminocyclohexyl)-ethane; 3,3',5,5'-tetramethyl-bis-(4-aminocyclohexyl)-methane; 3,3',5,5'-tetramethyl-bis-(4-aminocyclohexyl)-propane; 1,4-bis-(2-aminoethyl)-benzene; benzidine; 4,4'-thiodianiline; 3,3'-dimethoxybenzidine; 2,4-diaminotoluene; diamino-ditolylsulfone; 2,6-diaminopyridine; 4-methoxy-6-methyl-*m*-phenylenediamine; diamino-diphenyl ether; 4,4'-bis(*o*-toluidine); *o*-phenylenediamine; methylene-bis(*o*-chloroaniline);

bis(3,4-diaminophenyl)sulfone; diaminodiphenylsulfone; 4-chloro-*o*-phenylenediamine; *m*-aminobenzylamine; *m*-phenylenediamine; 4,4'-C₁-C₆-dianiline; aniline-formaldehyde resin; trimethylene glycol di-*p*-aminobenzoate; bis-(2-aminoethyl)-amine; bis-(3-aminopropyl)-amine; bis-(4-aminobutyl)amine; bis-(6-aminoethyl)-amine; and isomeric mixtures of dipropylene triamine and dibutylene triamine.

13. A single batch process for preparing a polymer composition which includes a polyalkylene-grafted interpolpolymer, said process comprising:

- a) forming a maleimide interpolpolymer in a mixing vessel by reacting an amine with a portion of maleic anhydride-derived mer units of an interpolpolymer comprising maleic anhydride-derived mer units and at least one of
 - 1) vinyl aromatic-derived mer units, and
 - 2) R¹(R²)ethylene-derived mer units in which R¹ and R² independently are H or substituted or unsubstituted C₁ to C₂₀ alkyl groups or alkoxy groups;
- b) adding sufficient maleated polyalkylene such that the mixing vessel contains from about 1 to about 50 weight percent maleated polyalkylene and from about 50 to about 99 weight percent maleimide interpolpolymer;
- c) without removing the product of step b) from the vessel, mixing from about 0.1 to about 10 weight percent of a diamine with the maleimide interpolpolymer and maleated polyalkylene in the mixing vessel to form said polyalkylene-grafted interpolpolymer; and
- d) without removing the product of step c) from the vessel, cooling the polyalkylene-grafted interpolpolymer to a temperature at which an extender is stable in the polyalkylene-grafted interpolpolymer and adding an extender to the mixer.

14. The process of claim 13 wherein said interpolpolymer that reacts with said amine in step a) comprises from about 0.01 to about 5 weight percent mer units derived from maleic anhydride.

15. The process of claim 13 wherein said vinyl aromatic-derived mer units are derived from any one or more of styrene, α -methylstyrene, *p*-methylstyrene, 4-phenylstyrene, *m*-methylstyrene, *o*-methylstyrene, *p*-tert-butylstyrene, and dimethylstyrene.

16. The process of claim 13 wherein R¹ and R² independently are selected from methyl, ethyl, propyl, isopropyl, butyl, isobutyl, pentyl, isopentyl, hexyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, octadecyl,

nonadecyl, eicosyl, cyclopropyl, 2,2-dimethylcyclopropyl, cyclopentyl, cyclohexyl, methoxymethyl, methoxyethyl, methoxypropyl, methoxybutyl, methoxypentyl, methoxyhexyl, methoxyoctyl, methoxynonyl, ethoxydecyl, ethoxymethyl, ethoxyethyl, ethoxypropyl, ethoxybutyl, ethoxypentyl, ethoxyhexyl, ethoxyheptyl, ethoxyoctyl, ethoxynonyl, ethoxydecyl, propoxymethyl, propoxyethyl, propoxypropyl, propoxybutyl, propoxypentyl, propoxyheptyl, propoxyoctyl, propoxynonyl, propoxydecyl, butoxymethyl, butoxyethyl, butoxypropyl, butoxybutyl, butoxypentyl, butoxyhexyl, butoxyheptyl, butoxyoctyl, butoxynonyl, butoxydecyl, pentyloxymethyl, pentyloxyethyl, pentyloxypropyl, pentyloxybutyl, pentyloxypentyl, pentyloxyhexyl, pentyloxyoctyl, pentyloxynonyl, pentyloxydecyl, hexyloxymethyl, hexyloxyethyl, hexyloxypropyl, hexyloxybutyl, hexyloxypentyl, hexyloxyhexyl, hexyloxyheptyl, hexyloxyoctyl, hexyloxynonyl, hexyloxydecyl, heptyloxymethyl, heptyloxyethyl, heptyloxypropyl, heptyloxybutyl, heptyloxypentyl, heptyloxyhexyl, heptyloxyheptyl, heptyloxyoctyl, heptyloxynonyl, heptyloxydecyl, octyloxymethyl, octyloxyethyl, octyloxypropyl, octyloxybutyl, octyloxypentyl, octyloxyhexyl, octyloxyheptyl, octyloxyoctyl, octyloxynonyl, decyloxymethyl, decyloxyethyl, decyloxypropyl, decyloxybutyl, decyloxypentyl, decyloxyhexyl, decyloxyheptyl, 1-methylethyl, 1-methylpropyl, 1-methylbutyl, 1-methylpentyl, 1-methylhexyl, 1-methylheptyl, 1-methyloctyl, 1-methylnonyl, 1-methyldecyl, 2-methylpropyl, 2-methylbutyl, 2-methylpentyl, 2-methylhexyl, 2-methylheptyl, 2-methyloctyl, 2,3,3-trimethylbutyl, 3-methylpentyl, 2,3-dimethylpentyl, 2,4-dimethylpentyl, 2,3,3,4-tetramethylpentyl, 3-methylhexyl, and 2,5-dimethylhexyl.

17. The process of claim 13 wherein said maleated polyalkylene comprises mer units derived from at least one of ethylene and propylene.

18. The process of claim 13 wherein said amine comprises from 1 to 50 carbon atoms and is selected from at least one of alkyl amines, alkyl benzyl amines, alkyl phenyl amines, alkoxybenzyl amines, alkyl aminobenzoates, and alkoxy aniline.

19. The process of claim 13 wherein said amine is a primary amine.